

REMARKS

In item 1 of the Office Action, the Examiner rejected Claims 1-13 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Reconsideration in view of this amendment is respectfully requested.

Use of the indefinite terms “showing” and “shows” have been amended, and new Claims 14 and 15 now recite “comprises” and “has”, respectively. New Claim 15 recites the amine oxide structure, and functional groups as linear, branched or cyclic, or a combination thereof. Further, new Claims 15, 17, 19, 21 and 25 do not use the indefinite terms “can be”, “such as”, “in particular” and “preferentially”, and clearly and distinctly defined the claimed invention. It is respectfully submitted that no new matter has been added.

New Claim 16 clearly recites the invention having at least one hydrocarbon residues that is an ethyl, n- or iso-propyl or n-, iso- or tertiary butyl group. The phrase “said residue” in new dependent Claim 17 is clearly defined in Claim 15 as a group of 1 to 22 carbon atoms as linear, branched and/or full or part cyclic structures which may or may not contain heteroatoms. Further, new Claim 20 recites that the reactive hydrogen atoms “comprises”, and does not “consist mainly of”, a polyether with at least two free hydroxy groups. It is respectfully submitted that no new matter has been added.

In item 2 of the Office Action, the Examiner rejected Claim 13 under 35 U.S.C. 112, second paragraph and 35 U.S.C. 101. In response, Applicants have amended Claim 13 to recite process steps. It is respectfully submitted that no new matter has been added. Accordingly, Applicants respectfully submit that the rejections of Claim 13 have been overcome.

In item 3 of the Office Action, the Examiner rejected Claim 12 under 35 U.S.C. 112, first paragraph. In response, Applicants have amended Claim 12 to call for adding “one or more surfactants” as stabilizers. Support for the amendment can be found in the originally filed specification at page 7, lines 13-18. No new matter has been added.

In item 4 of the Office Action, the Examiner has objected to the specification because it does not contain a brief description of the drawings with the appropriate

heading. In response, Applicants have amended the specification to include a Brief Description of the Drawings section. No new matter has been added.

In item 5 of the Office Action, the Examiner notes the present application currently names joint inventors, and in considering patentability of the claims under 35 U.S.C. 103(a), the Examiner presumes that the subject matter of the various claims were commonly owned at the time.

Applicants acknowledge herein that all subject matter of the invention was commonly owned at the time the claims were made.

In paragraph 6 of the Office Action, the Examiner rejected Claims 1-4, 6-11 and 13 under the provision of 35 U.S.C. 102 (b) as being anticipated by United States Patent No. 5,008,336, to Richey, Jr. et al. Reconsideration is respectfully requested.

A prima facie case of anticipation, according to the Federal Circuit, "requires the presence in a single prior art disclosure of each and every element of the claimed invention." *Lewmar Marine v. Barient, Inc.* 3 U.S.P.Q.2d 1766, 1767 (Fed. Cir. 1987). Applicants respectfully submit that Richey '336 does not meet that standard.

The present claimed invention calls for a process for the manufacturing of polyurethane foam, by the conversion of compounds containing at least two isocyanate groups with certain compounds containing at least two reactive hydrogen atoms. The claimed process also calls for using catalysts with an amine oxide group having small chained, linear, branched or cyclic hydrocarbon residues. The residues contain heteroatoms and at least one residue is an ethyl, n- or iso-propyl or n-, iso- or tertiary butyl group. Moreover, the presently claimed invention is capable of producing polyurethane foamed plastics with low or no emissions and little or no odor through the use of novel amine catalysts.

Applicants respectfully submit that Richey '336 does not disclose, teach or suggest such a novel process. Richey '336 refers to coating compositions comprising a hydroxy alkyl amine oxide which is used as reactive diluents for the film building process, and **does not function as a catalyst**. Instead the cross-linking agent reacts with the reactive diluents. Richey '336 teaches:

"polyol-containing polymer and cross-linking agent. The polymer has what is sometimes referred to as "A" groups. "A" groups include -OH and -NHCO - moieties which are reactive with "B" groups of cross-linking agents. The cross-linking agents have greater than two "B" groups which may be amino

cross-linker groups. **The reactive diluents** of the compositions of the invention contain at least two reactive "A" groups",

Richey '336 at col. 3, lines, 27-35 (emphasis added).

Richey '336 describes a formaldehyde/melamine/aminoplast cross-linking agent (see Example 3, col. 7, lines 30-31), which can include the use of an "acidic cross-linking catalyst" (Claim 7). Specifically, Richey '336 discloses that when the cross linking agent is a diisocyanate, suitable catalysts for the polyurethane reaction include:

"[w]hen the cross-linking agent is a diisocyanate... suitable catalysts include tertiary amines such as triethyl amine, bis(dimethylaminoethyl) ether and the like; and organometallic salts of tin, mercury, zinc, bismuth and the like, such as dibutyl tin diacetate, zinc octoate, phenyl mercuric acetate and bismuth octoate."

Richey '336 at col.6, lines 10-17.

Significantly, **amine oxides are not mentioned** as catalysts, yet more support that Richey '336 does not disclose, and in fact, teaches away from the present invention. Thus, a fair reading of Richey '336 is that Richey '336 never deemed to practice the use of diisocyanate as a catalyst. Richey '336 only came to the invention because they were looking for a reactive solvent that does not interfere with an acidic cross linking catalyst.

Richey '336 further provides:

"[b]y providing the amine nitrogen as an oxide, the basicity of the nitrogen is reduced and thus is relatively inert with respect to acidic cross-linking catalysts, if any are present, i.e., the basicity of the amine is insufficient to unduly neutralize any acidic cross-linking catalyst that may be present."

Richey '336 at col.3, lines 17-22. Thus, it follows that Richey '336 wanted to use an acidic catalyst to facilitate the cross linking condensation reaction using any of the crosslinking agents mentioned at col. 3, lines 58 et seq. Nowhere in Richey '336 is it mentioned to use an amine oxide as an effective catalyst for the polyurethane reaction as called for in the present claims.

For these reasons, Applicant respectfully requests withdrawal of the § 102(b) rejection over Richey '336.

In items 7-8 of the Office Action, the Examiner rejected Claims 1-13 under 35 U.S.C. 103 as being unpatentably obvious over Nahas, United States Patents Nos.

4,659,799 or U.S. 4,713,26, Linden, United States Patent No. 4,672,000 or Dammann, United States Patent No. 4,788,083. Reconsideration is respectfully requested.

A finding of obviousness under § 103 requires a determination of the scope and content of the prior art, the level of ordinary skill in the art, the differences between the claimed subject matter and the prior art, and whether the differences are such that the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made. *Graham v. Deere* 383 U.S. 1 (1966). The relevant inquiry is whether the prior art suggests the invention and whether the prior art provides one of ordinary skill in the art with a reasonable expectation of success. *In re O'Farrell* 853 F.2d 894, 903 (Fed. Cir.1988).

Nahas '265 and '799 are discussed together, as they are almost textually identical. The Nahas references describe a process for **curing a coating composition** with a **vaporous amine catalyst**, wherein the coating composition is an acrylic polymer containing hydroxyl groups, amine containing groups and an aliphatic polyisocyanate. The Nahas references state:

“Typical amines that can be used are as follows: tertiary amines containing substituents such as alkyl... [a]dditionally, it is conceivable to use amine oxides and quaternary ammonium amines depending upon the practicality of providing **such amines in the vaporous phase**. A myriad of proprietary tertiary amine catalyst currently are available and **should** function in the process additionally. One preferred catalyst is dimethyl ethanol amine”

Nahas et al.'265, col. 4, line 59 through col. 5, line 12 and Nahas et al.'799, col.4, line 61 through col.5, line 11 (emphasis added).

Significantly, the Nahas references do not provide examples with amine oxides or quaternary ammonium amines, but instead appear to have copied this text from a different source. **Neither amine oxides nor quaternary ammonium amines can be vaporized**, nor are quaternary ammonium amines active polyurethane catalysts. As such, the Nahas references rely solely on the statement “myriad of proprietary tertiary amines catalysts...are available and **should** function”.

Further in this regard, Linden discloses **a coating composition rapidly curable** at room temperature in the presence of a vaporous tertiary amine catalyst. The coating composition comprises a poly(nitro alcohol) compound and a multi-isocyanate curing agent. Likewise, Linden repeats (or copies) the use amine oxides

and quaternary ammonium amines: **“depending upon the practicality of providing such amines in the vaporous phase,”** and the reference to amine catalysts from Nahas et al. ‘265. Applicants again point out that amine oxide upon vaporization immediately decomposes. **Amine oxides are not known to exist in the vaporous state.**

Yet again, we see the same reference in Dammann et al., wherein amine oxide is only mentioned in one sentence (see Dammann et al. at col.10, line 64), and that sentence, in fact the identical paragraph, can be found in Nahas et al. ‘265, Nahas et al. ‘799 and Linden ‘000.

Dammann et al. disclose an activatable catalyst which is effective for the reaction of a hydroxyl compound and an isocyanate to be utilized in the **cure of a coating composition** of a polyol and a polyisocyanate. The activatable catalyst is activated in the presence of an amine activator or heat and comprises the reaction product of a metal catalyst selected from a tin catalyst, a bismuth catalyst, and mixtures thereof; and a molar excess of a complexing agent. The complexing agent is selected from a mercapto compound, a polyphenol characterized by being reactable with an isocyanate group in the presence of a tertiary amine activator, and mixtures thereof. Significantly, neither the amine activator nor the tertiary amine activator are themselves catalysts for the polyurethane reaction.

Applicants submit the only reason for the reference to the amine oxides in these references is because the aforementioned identical paragraph was copied into each of the cited references. Referring to conventional tertiary amine catalysts, and purely by chance noting amine oxides and quaternary ammonium amines. The latter is not an isocyanate/polyurethane catalysts.

All four references refer to the possibility of employing the amine catalyst in the vapor phase. Amine oxides cannot be vaporized without decomposing. Applicant respectfully submits that the suggestion to use amine oxides in the vaporous stage to a person skilled in the art is meaningless and is not a fair teaching of the present claimed invention because one skilled in the art would immediately conclude that amine oxides cannot be vaporized and would have only considered the tertiary amines as suitable catalysts.

Importantly, the cited prior references all relate to cure coatings. None of the references teach or suggest the use of amine oxides as a catalyst for the manufacture

of polyurethane foams. Nor do they teach that in order to render amine oxides capable for being build into the polymer the reaction temperature must exceed at least 50°C during the course of the reaction in order to allow for Cope elimination to take place (see page 11, line 23 through page 12, line 7, of the instant specification). Further, there is no suggestion of the excellent low amine emission characteristics of polyurethane foams when produced with amine oxides as catalysts instead of the conventional tertiary amines.

It is maintained that the prior art references do not teach or suggest the present invention and the present claims are not rendered unpatentable under § 103(a) over the references of record.

In view of the foregoing discussion, applicant respectfully submits that the pending claims are allowable over the cited prior art. Allowance of the claims is therefore respectfully solicited.

Respectfully submitted,

A handwritten signature in black ink, consisting of a stylized 'K' followed by a large loop and a horizontal line extending to the right.

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